Arch 463
ECS
Fall 2001 Name_____

Midterm II

30 Multiple Choice Questions

1. In Christian Norberg-Schultz' source-path-receiver terminology for describing the interaction between buildings and environmental forces, a window is a
   A. source
   B. path
   C. receiver
   D. all of the above

2. A single architectural element can be described as
   A. a filter
   B. both a filter and a barrier
   C. a filter, connector, and barrier
   D. any of the above

3. The architectural layer in which a designer has the most freedom in responding to environmental forces is the
   A. sky layer
   B. near surface layer
   C. surface layer
   D. subsurface layer

4. An underground office benefits most from
   A. the cooling effect of the earth's thermal mass
   B. shelter from prevailing and diurnal winds
   C. avoidance of glare from sunlight
   D. all of the above

5. In the winter the surface temperature of the inside of an exterior wall of a residence is cooler than the air temperature because
   A. the wall is thermally massive
   B. an insulating air film clings to the wall's surface
   C. both of the above
   D. none of the above

6. An insulated wall is superior to an uninsulated wall because the insulated wall
   A. stops cool breezes
   B. reduces infiltration
   C. results in radiant temperatures near ambient air temperature
   D. all of the above

7. In a hot humid summer climate a superinsulated wall should
   A. include a radiant barrier
   B. be fortified by Larsen trusses
   C. be thermally massive
   D. all of the above

8. A straw bale wall is considered superinsulated because
   A. it's really thick
   B. its R-value is 30+
   C. its plastered interior is thermally massive
   D. all of the above

9. A passive cooling strategy that avoids gain is
   A. shading
   B. daylighting
   C. insulation
   D. all of the above

10. Given equal aperture size, in the summer in the Northern Hemisphere it's most important to shade windows on
   A. the south façade
   B. the north façade
   C. the west façade
   D. the east façade

11. The wind shadow will be less turbulent for
   A. a flat roof building
   B. a multistory building
   C. a building with a gable roof with the ridge perpendicular to the prevailing wind
   D. all of the above which provide equivalent wind shadows

12. The nature of prevailing wind is
   A. constant in speed and direction
   B. diurnally reversing direction
   C. gusty and shifty
   D. unrelenting

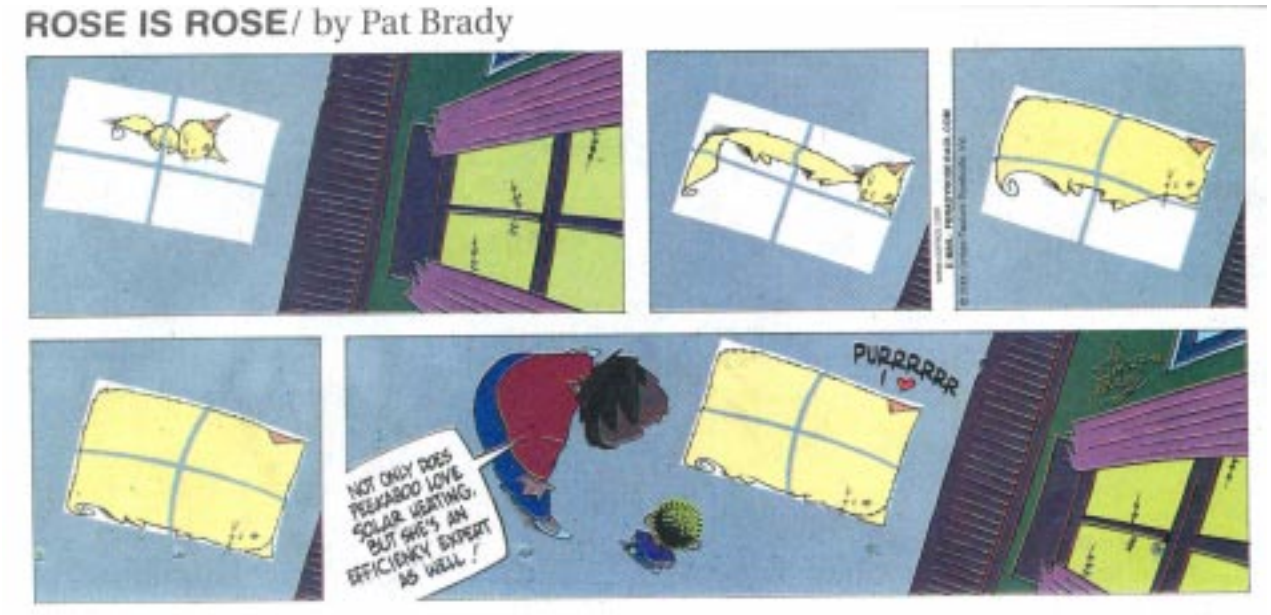
13. The best way to remove heat from an office via natural ventilation without blowing the papers around is to
    A. ensure that the inlets are larger than the outlets
    B. ensure that the outlets are larger than the inlets
    C. provide low inlets and high outlets
    D. use clerestories for ventilation

14. A stack ventilator can be made more efficient by
    A. increasing its height
    B. increasing the aperture of the inlet, outlet, and stack cross sections
    C. heating air at the top of the stack
    D. all of the above

15. Materials that act as effective thermal mass have
    A. the highest specific heat
    B. the highest density
    C. the lowest conductance
    D. none of the above

16. When determining the R-value of a wall empirically with a spot pyranometer and weather meter, results can be skewed by
    A. thermal mass in the wall
    B. the action of solar radiation on the wall
    C. mechanical heating or cooling systems
    D. all of the above

17. HEED can model
    A. glazing
    B. thermal mass
    C. mechanical heating and cooling systems
    D. all of the above



18. Passive heating strategies include
    A. south-facing apertures with thermal mass
    B. roof ponds
    C. air-based thermosiphons
    D. all of the above

19. The advantage of an active solar heating system over passive solar systems is
    A. greater efficiency
    B. lower first cost
    C. control of timing of heating
    D. all of the above

20. Seasonal storage of energy can be accomplished by
    A. a roof pond (skytherm) system
    B. grid-connected photovoltaics
    C. water-based active solar collectors
    D. all of the above

21. The Brookhaven house demonstrates improved energy conservation by
    A. favorable orientation
    B. use of multiple passive heating systems
    C. increased insulation levels
    D. all of the above

22. In a large commercial or institutional building with a double wall glazing system, the space between the glazing layers is used to
    A. store heat
    B. regulate the intensity and flow of the heat
    C. contain solar collectors to generate electricity
    D. all of the above

23. In a multistory building, it's impossible to use
    A. a trombe wall to heat all the floors
    B. a roof pond to heat all the floors
    C. photovoltaics to heat all the floors
    D. all of the above

24. Glazing that is effective at reducing solar gain but ineffective at limiting reradiation is
    A. single pane clear glass
    B. single pane blue-green glass
    C. double pane reflective glass (outside), clear glass (inside)
    D. double pane blue glass (outside), clear glass (inside)

25. Glazing that can provide a 80% reduction of solar gain is
    A. evacuated glass
    B. fritted glass
    C. residential grade low-E glass
    D. all of the above

26. The type of glazing that can produce energy as well as provide shading is
    A. holographic diffractive structure glass
    B. electrochromatic glass
    C. photovoltaic glass
    D. all of the above

27. Photovoltaic arrays can be integrated into a building's
    A. roof
    B. shading devices
    C. south façade
    D. all of the above

28. Photovoltaic arrays can store excess energy
    A. in a rock bed
    B. in the utilities' grid
    C. in a water tank
    D. all of the above

29. The most suitable choice for glazing the north façade of an architectural office in Chicago is
    A. bronze glass
    B. commercial low-e glass
    C. fritted glass
    D. photovoltaic glass

30. Kahn's Kimball Museum in Fort Worth, TX, proves that a "little big window" can solve thermal problems while
    A. providing adequate daylighting
    B. allowing adequate natural ventilation
    C. capturing zen views
    D. all of the above